draganfly™
INNOVATIONS INC

Draganflyer X-Pro RC Helicopter

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Assembly & Maintenance Manual

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Warning!

This aircraft is not a toy. Improper use may result in serious injury, property damage or even death. It is the responsibility of the pilot to fly in a manner such that, in the event of equipment malfunctions, no harm will come to him, bystanders or property.

This aircraft requires a skilled pilot capable of flying a model helicopter. Do not attempt to fly this aircraft without sufficient training or experience or you WILL crash it and damage it.

Never fly this aircraft over or near people.

This aircraft is radio controlled, and as such is subject to possible radio interference which may cause complete loss of control and subsequent uncontrolled crash.

Always turn the transmitter on first and off last when flying.

Always check for proper response of throttle prior to arming the motors before every flight.

The battery pack included with this aircraft should only be charged with an appropriate charger and never be left unattended while charging. Locate battery and charger away from flammable materials and on a non flammable surface while charging.

The battery in this system is a very high energy unit and may explode or ignite in dramatic fashion if shorted or overcharged.

Safety glasses should be worn when in close proximity to the Draganflyer X-Pro during flight operations.

The manufacturers of this aircraft accept no liability in any form whatsoever from the use or misuse of this product.

If you do not accept the responsibility of proper use of this aircraft and associated equipment, then return it immediately prior to assembly for a refund. Restocking fee may apply.

Draganflyer X-Pro RC Helicopter Parts List

Figure 1 Disassembled X-Pro

(1) Main XPRO center body section with control board and clear Dome

(2) Front / Rear arms with motor counter clockwise pulley, blade hub plate and self locking nuts

(2) Left / Right arms with motor clockwise pulley, blade hub plate and self locking nuts

(2) Sets of counter clockwise carbon fiber rotor blades

(2) Sets of clockwise carbon fiber rotor blades

(1) Transmitter case

(1) PCM transmitter

(1) Triton quick charger

(1) Flight pack charge adapter cable

(1) Transmitter charge adapter cable

Optional Equipment if purchased

(1) Hi resolution camera with articulated mount and video transmitter

(1) Wireless video receiver

(1) Set of coaxial cables

(1) Wall mount power supply for wireless receiver.

Assembly

The XPRO can be assembled very quickly. The only tool required is a small adjustable wrench or a 5/16 nut driver.

Once assembled, the XPRO can be easily collapsed in a matter of minutes for easy transport. No tools are required to collapse or fold out the XPRO.

Locate the front arm. It will have a

Figure 2 Front and rear arms with blades

Pulley with a counter clockwise swirl cut into it and will have the camera mounted on it if you purchased that option. If not, the front and rear arms are identical and interchangeable.

Locate the XPRO center body with the clear dome. Locate the "front" of the this body which can be identified by the red LED located on the control circuit board.

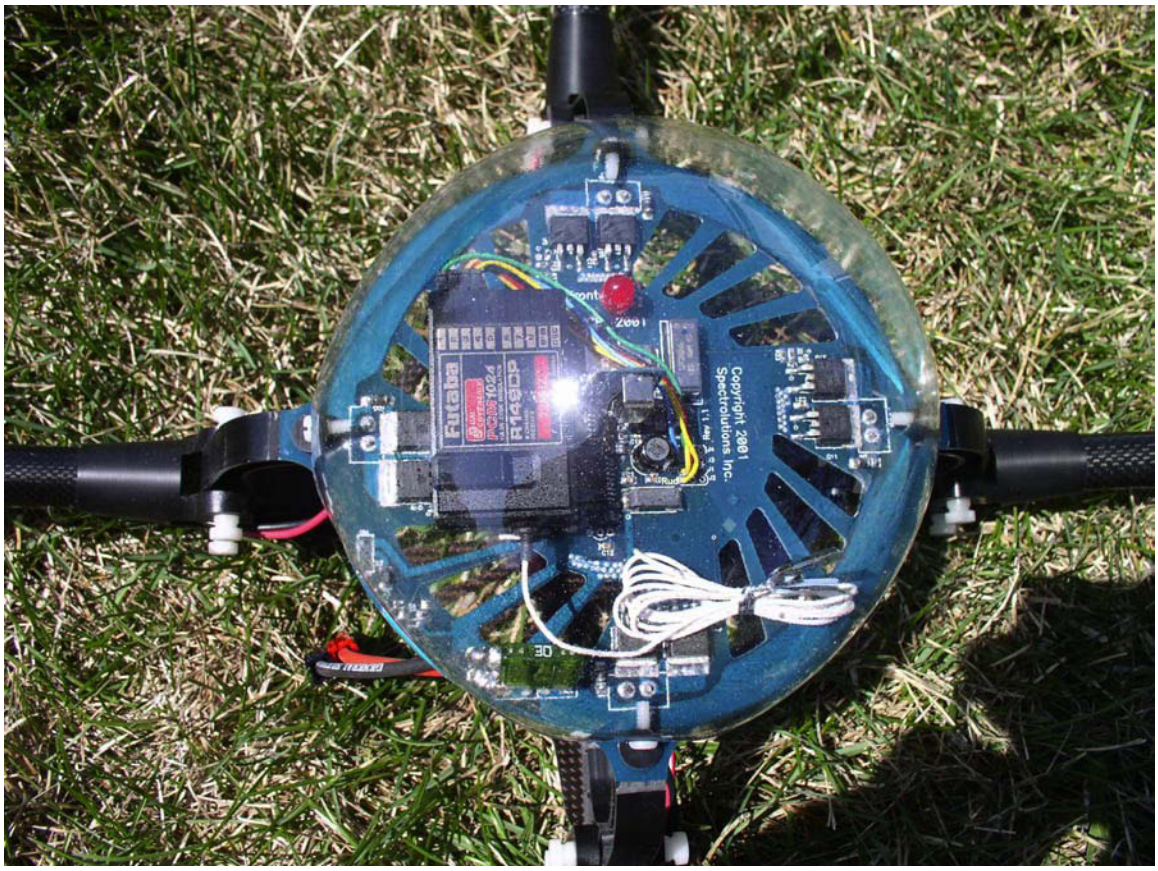

Figure 3 Control board, top view

Unscrew the white nylon thumb screws from the shoulder joint on the arm, (the end opposite the motor) and slide both 1/4 inch diameter nylon standoffs out of the holes.

Set the center section flat on a table and while supporting the front arm slide the shoulder joint over the vertical riser frame near the bottom. The pulley should be facing upwards. Line up the two 1/4 inch holes in the shoulder with the matching wholes on the vertical riser and then insert one of the white nylon standoffs into each whole. Screw the thumbscrews back into the standoffs to secure the arm.

Figure 4 Inserting thumbnut in shoulder

Repeat the above procedure for the rear arm; this will help balance the assembly.

Locate the left and right arms (clockwise swirl machined into pulley) these two arms are also identical and interchangeable.

Figure 5 Right and left arms with rotor blades

Install these on the left and right side of the center section in the same manner as you did the front and rear.

OPTIONAL Articulated wireless camera:

If you purchased the wireless camera option, there are three connections that must be made for this. The small black 2 pin power connector plugs into the black connector on the bottom of the circuit board. The two three pin black servo connectors, marked "1" and "2" plug into their respectively marked extension cables already installed on the control board.

Locate the motor harness plug for the front arm motor (red and black wires with white connector) and plug it into the bottom of the circuit board to the white connector right next to the vertical frame riser for the front arm, (nearest connector).

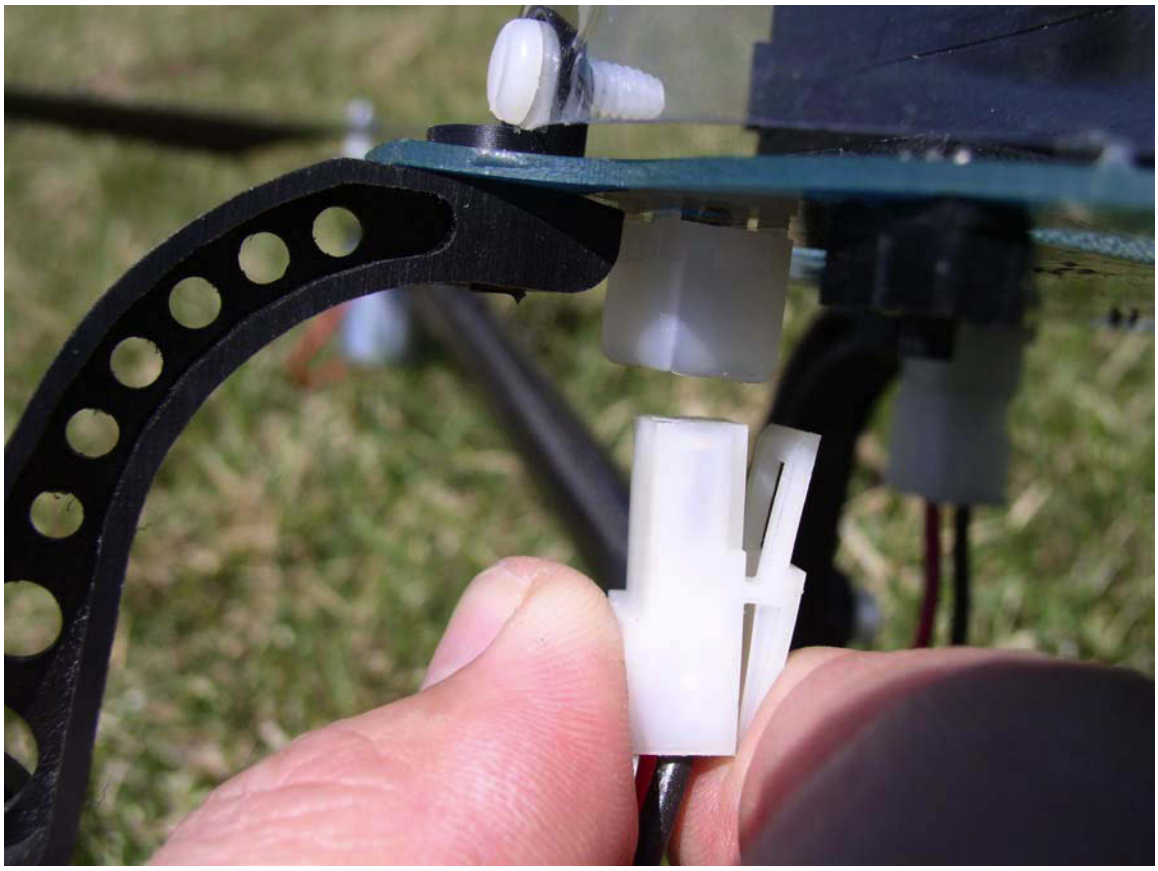

Figure 6 Inserting motor connector

In a similar fashion plug in the remaining motor connectors to the plugs nearest them. The plugs are polarized and will only go in one orientation.

Important:

The following tests are intentionally done with the rotor blades removed for safety. Make sure the rotor blades have not been installed for this step.

Warning!
Always turn the transmitter on first before putting the battery in the XPRO or turning the aircraft on. Likewise ALWAYS remove the battery from the XPRO prior to turning the transmitter of. Failure to do so may cause the XPRO to start up out of control and cause serious damage, injury or death.

NEVER leave the battery connected to the XPRO when not in use, immediately remove the battery when done flying.

Locate the transmitter and turn it on.

Locate the main power switch for the XPRO, it is a small black slide switch located on the bottom side of the control board on the left hand rear quadrant.

Make sure this switch is in the OFF position and shown in white lettering on the top of the circuit board. Note at this time the "arming button" located to the right of the power switch.

If at any time during this test, the Draganflyer X-Pro does not function as described, please call the factory for assistance.

Make sure that the power switch on the XPRO is in the OFF position.

Install the flight pack onto the lower frame plate of the XPRO using the provided hook and loop tape.

Plug the flight battery into the control board using the large black and red power connectors.

Turn on the XPRO by sliding the main power switch forward.

The red LED located near the front of the circuit board should start to blink.

Radio check:

Move the throttle stick (left stick) up and down and note the change in the blink rate of the red LED. It should blink at a slow rate when the throttle is low (down all the way) and blink faster as the stick is pushed forward. The motors should not turn during this test.

Return the throttle stick to its lowest point (back all the way) and then push the arming switch near the main power switch. This enables the motor drive. The only way to disable the motor drives at this point is to turn the XPRO off or disconnect the battery.

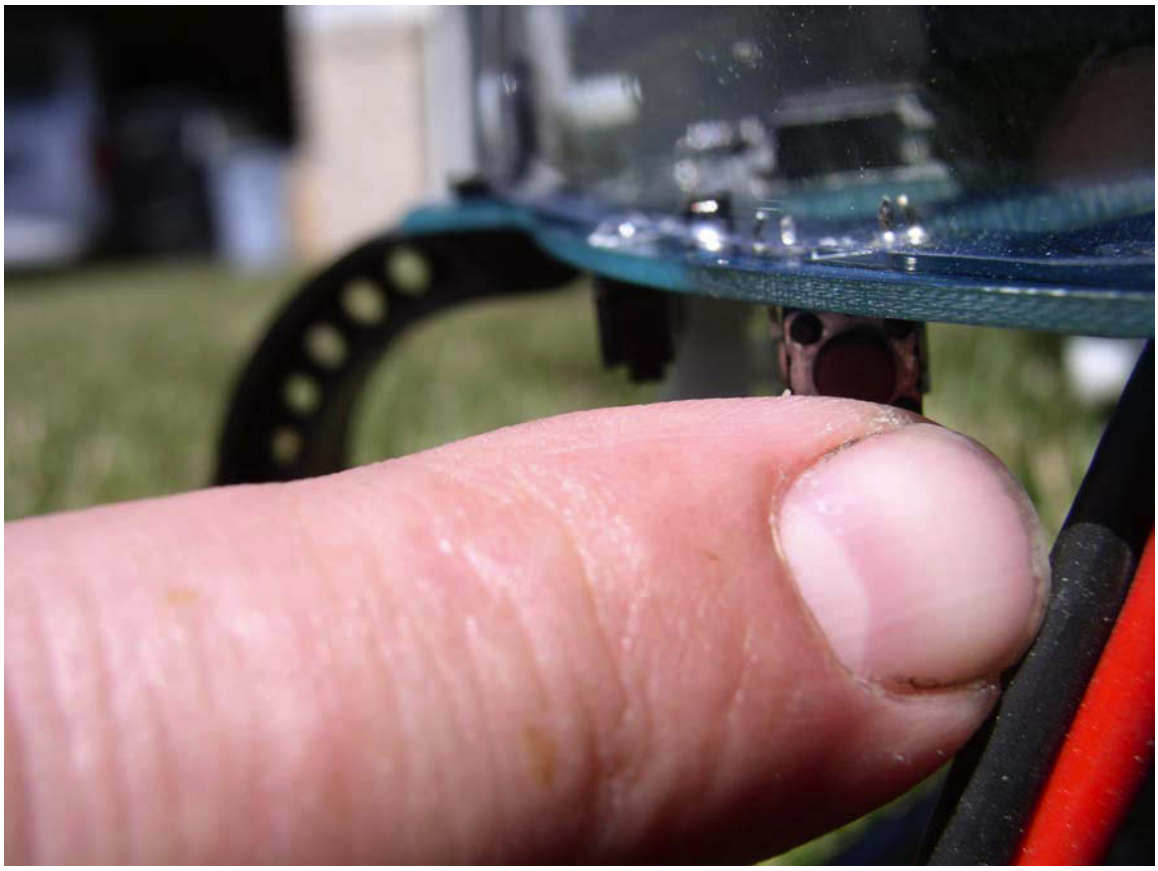

Figure 7 Arming switch

Control Check:

Slowly push the throttle stick forward but do not go any further then about 1/3 throttle or you may over speed the motors (with no blades to load them down).

All four motors should run at about the same speed.

Push the cyclic control stick (right stick) on the transmitter forward. The front motor should stop spinning, and the rear one should speed up.

Pull the cyclic stick back, the front motor should speed up, and the rear motor should stop.

Push the cyclic stick to the right, the right motor should stop and the left motor should speed up.

Push the cyclic stick to the left, the right motor should speed up and the left motor should slow down and stop.

Push the rudder/ throttle stick (left stick) on the transmitter to the right. The front and rear motors should speed up and the left and right should slow down and possibly stop.

Push the rudder stick to the left. The front and rear motors should slow down, and the left and right motors should speed up.

Gyro check:

Now pick up the XPRO and hold it firmly by the base with the transmitter still set to 1/3 throttle.

Rapidly tilt the airframe left and right. Notice that when tilted to the left, the left motor should speed up, and when tilted to the right, the right motor will speed up.

Tilt the XPRO forward and backwards and note that the front motor will speed up when tilted forward, and the rear motor will speed up when tilted back.

Rotate the XPRO around its yaw axis and notice that the front / rear motors will speed up and slow down together, but opposite the left and right motors.

Rotor blade installation:

Important
Set the Draganflyer X-PRO down, turn if off, disconnect the battery from the XPRO.

Locate the front/ rear carbon fiber rotor sets. These are identical and interchangeable and are designed for counter clockwise rotation.

Locate the front motor of the XPRO (nearest the red LED) and remove the two #6/32 self locking nuts and the carbon fiber blade hub plate.

Install one carbon fiber rotor blade on each bolt.

Place the carbon fiber rotor hub plate back on the bolts, and then screw on the two self locking nuts. These should be made just tight enough so that the blades can still be rotated on the bolts, but should stay in place when released.

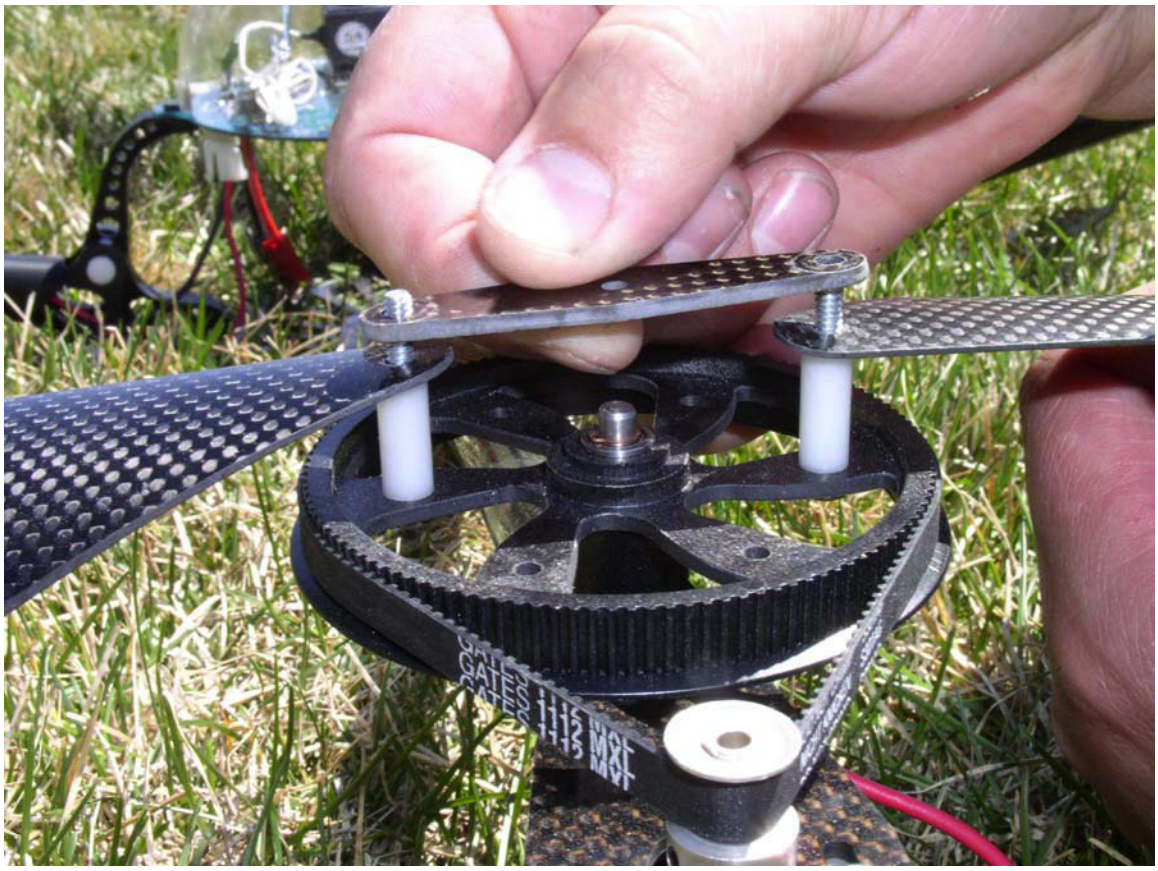
Figure 8 Installing rotor hub plate

Figure 9 installing self locking nut on rotor hub

Install the other set of counter clockwise blades on the rear pulley in a similar fashion.

Locate the two sets of clockwise carbon fiber rotor blades and install in a similar fashion on the left and right pulleys.

For each of the four sets of rotor blades, make sure that they are roughly in a straight line with the center hub plate. They need not be exact, as they will pull straight during flight.

First Flight:

Warning

You must be a trained RC model helicopter pilot to fly this aircraft. If you lack proper training and experience in similar models you WILL crash and may cause serious injury or death.

The Draganflyer X-Pro uses control stick functions in the same way as a conventional mode II model helicopter. Anyone comfortable flying a conventional RC model helicopter should be able to fly the XPRO in a short period of time. The primary difference is that the yaw control for the XPRO is slower then a conventional model helicopter.

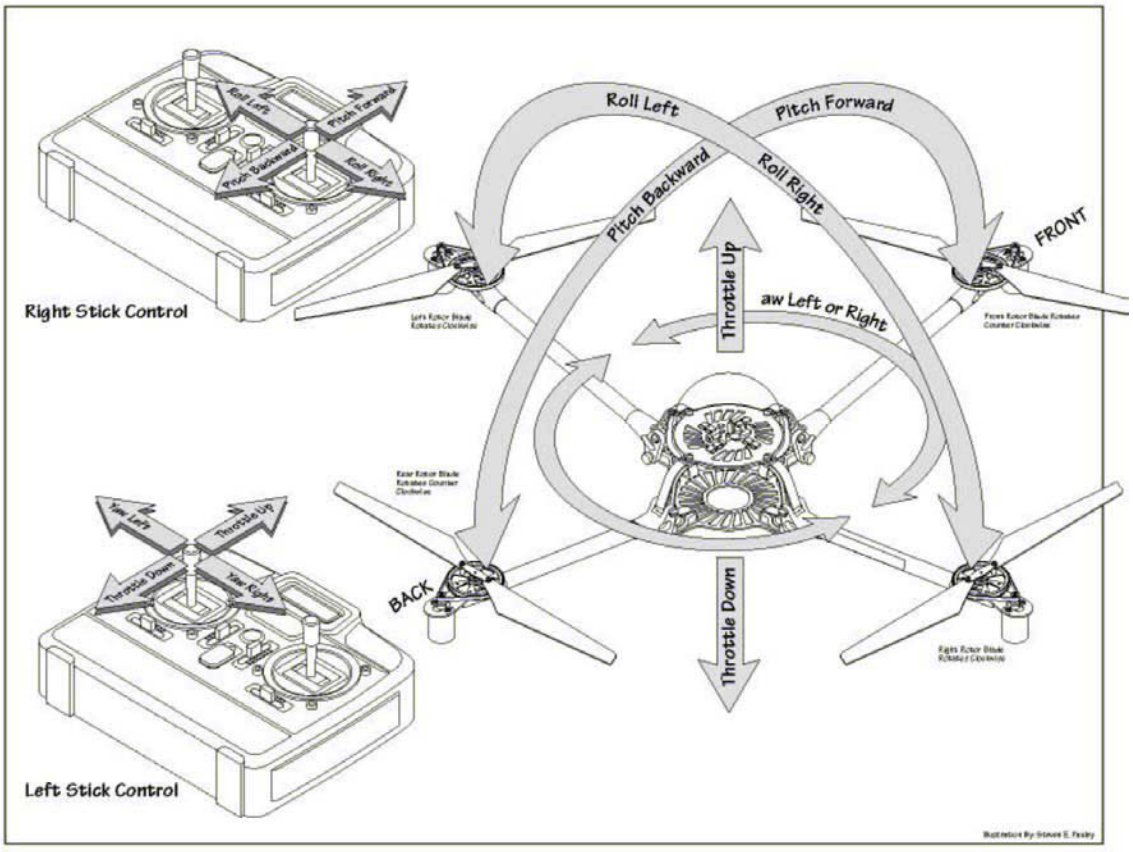

Figure 10 Draganflyer X-Pro control system

Turn on the transmitter (Warning ALWAYS turn the transmitter on first, and off last)

Set the throttle stick to minimum, and set the transmitter within easy reach.

While holding the XPRO from the bottom in one hand with a FIRM grip. Make sure you are clear of the rotor blades in case they spin unexpectedly.

Make sure the XPRO main switch is OFF and install and connect flight battery, stay clear of the rotor blades and maintain a firm grip on the helicopter.

Double check again that the throttle is at the minimum positions, and that the transmitter is on.

While staying clear of the rotor blades, turn the XPRO main switch to the ON position. The motors should not spin.

Check the radio response by observing the blinking LED at the front of the aircraft, it should blink slowly at minimum throttle, and increase in rate when the throttle is increased.

Set the throttle stick to minimum throttle, then while maintaining a firm grip on the helicopter, press the arming switch. The blades may make a momentary twitch, this is normal. Also the LED rate will slow down after arming.

Set the XPRO onto level ground and back a safe distance away from it.

NOTE the LED may be difficult to see in bright sunlight, you may have to shade the LED in order to see it.

NEVER press the arming switch if the LED does not respond, the XPRO may go out of control.

IMPORTANT
The Draganflyer XPRO, although very symmetric does have a front as described previously. The red LED is near the front, and the antenna sticks out the back. Orientation is absolutely vital to fly a RC model helicopter, and you must always be aware of wich rotor is the front rotor. It is recommended that you paint the tips of the front rotor a bright color or white to help identify the front of the aircraft in-flight.

While standing a safe distance away, SLOWLY raise the throttle stick until the blades start spinning. At about 1/4 throttle the cyclic control will respond, but it is suppressed below that.

The XPRO should hover at around half throttle, so be careful not to put in to much throttle and get airborne unexpectedly.

Slowly bring in more throttles and move the sticks around to get familiar with the control rates before taking it into a low hover.

Once comfortable you should fly at least on full battery pack below 10 feet altitude to get a feel for the response characteristics when the battery starts to get low.

As the battery level gets low, more and more throttle will be required to maintain altitude. When you reach about 3/4 throttle, the helicopter will start to become less stable, as it is balanced electronically. This is a good time to land as the battery will not last much longer anyway.

After landing, first turn the XPRO main switch OFF, and disconnect the flight battery THEN turn off the transmitter.

Let the battery cool off before recharging and over heated battery may explode or leak.

It is also a good idea to let the motors cool down a bit between flights in order to prolong their life.

Collapsing for storage and transportation

Figure 11 Folded Draganflyer X-Pro

The XPRO easily collapses into a much smaller space for transport or storage without the need for any tools.

Simply remove the lower shoulder bolt from the front arm, lift the arm up enough so that you can put the shoulder bolt back in and screw the thumbnut back in so that you wont lose it. Repeat for all for arms.

Take each set of blades and swivel them about 90 degrees on their mounting bolts towards the center of the helicopter.

Fold each arm straight up and secure them all together with a rubber band. You can then pick up the Draganflyer XPRO using one of the arms as a handle.

Be careful so that the blades do not scratch the clear dome.

Also, if packing the aircraft for long periods of time or in excessive heat (like in a car) makes sure nothing is pressing against the rotor blades as they may deform. If the blades deform, the helicopter will not be able to fly or it will be unstable.

The blades should be removed if the helicopter is to be shipped, and if good packaging is not available, or for maximum protection, the arms should be removed as well.

OPTIONAL Articulated wireless camera operation.

Connect the wireless video receiver to a composite video monitor using the supplied coaxial cable. Audio is not present, so it need not be connected.

Connect the wall mounted power supply to the receiver, and plug it in.

Make sure the receiver is turned on (green LED will light up)

If the camera is connected on the XPRO, it will be on and transmitting as soon as a flight battery is connected and the main power switch is turned on.

The camera can be panned and tilted by using the trim levers on the upper rear left and right corners of the transmitter.

One lever is for pan, the other is for tilt.

IMPORTANT be sure to tilt the camera full up before landing or it may hit the ground.

Maintenance:

The Draganflyer X-Pro RC Helicopter requires very little maintenance.

Before each flight:

Check radio response as described in First flight procedure.

Check to make sure that the rotor blade nuts are snug and that the rotor blades will swivel but with moderate friction.

Check that all the thumbnuts are present and snug.

Periodically:

Check belts for wear or damage. Damaged belts will ride up on the pulley teeth and skip making a dull pop or thud sound. Damaged belts must be replaced, do not try to over tighten them.

Check belt tension, belts should not be tight, there should be a small amount of slack in the belt. If you push lightly in the center of the span of the belt, it should easily deflect from 1/8 to 1/4 inch. An over tightened belt will require more power from that motor.

Check rotor pitch. If the blades are removed and laid on a flat surface, both the leading and trailing edge should touch the table or be very close, along the full length of the blades. Blades that become out of pitch (usually due to handling or heat) will make a low buzzing sound while flying, and will lose lift when more power is applied, usually causing one side of the helicopter to dip excessively.

Check motor brushes. Eventually the brushes in the motors will wear out, at which point the motors must be replaced. The brushes can be examined by looking through the vent holes on the side of the motor. New brushes are approximately 1/8 inch thick. Consider replacing the motors when the brush thickness wears to less then 1/3 of this amount.

After a hard landing or crash:

Check pulleys for cracks especially near the hubs. Replace any broken or cracked pulley.

Check rotor blades for cracks near the mounting bolts or delamination. Replace any damaged blades.

Check plastic frame components for cracks, especially near the shoulder joints. Arms with cracked plastic components may be sent in for repair.

Check to make sure that all rotor shafts are vertical; rotors are horizonatal.

Check battery pack for damage. A damaged battery pack should not be used. Dispose of properly.

Repeat the initial checkout procedure with blades removed to verify function of the circuit board before flight.

The belts may be "rolled" off from the large pulley instead of removing the rotor blades altogether, but it is harder to tell if the motors speed up or slow down this way.

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